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Age-related NADH oxidase (arNOX)-catalyzed oxidative damage to skin proteins.

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Abstract

Age-related NADH oxidase (arNOX), a cell surface-located hydroquinone oxidase capable of superoxide generation, appears at age 30 and increases with age thereafter. The ectodomain of arNOX is shed from the cell surface into body fluids including sera and saliva where its activity was measured spectrophotometrically using a reduction of ferricytochrome c as a measure of superoxide generation. The autofluorescence of advanced glycation end products correlates with epidermal arNOX activity as well. To demonstrate protein cross-linking, a fluorescence-labeled analog of tyrosine, tyramine, that would react with proteins carrying arNOX-generated tyrosyl radicals was used. The assay demonstrated the potential for arNOX-induced oxidative damage (dityrosine formation) to human collagen and elastin and to other surface proteins of intact human embryo fibroblasts and frozen sections from epidermal punch biopsies. The findings support a role for arNOX as a major source of oxidative damage leading to cross-linking of skin proteins.

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